FLIGHT TEST INVESTIGATION ON LOSS OF CONTROL DUE TO FLAP AND LANDING GEAR CONFIGURATION CHANGE

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Abstract

Extension of flaps during landing and take-offs not only increases the lift produced by the wing due to change in camber of the aerofoil but also increases the wing downwash which reduces the angle of attack on the horizontal tail and reduces the tail efficiency resulted in to significant change in pitch attitude, aircraft altitude and airspeed. Lowering of landing gear increases the interference drag and lead to vortex shedding which reduces the pressure underneath the wing, as a result aircraft have pitching down moment. During this phase pilot is pre-occupied and might be distracted and if requisite control input is not provided by the pilot to maintain required aircraft attitude it can lead to uncontrollable flight condition and loss of control in flight. To investigate these effects, Flight tests were carried out on Hansa-3 and Cessna-206H aircraft at IIT Kanpur along with Pilot and on Cirrus Jet SF-50 in X-Plane 11 Flight Simulator. During flight test aircraft exhibited significant change in pitch attitude, roll angle, aircraft altitude and airspeed and aircraft even stalled. Extension of flaps with 30° bank along with extended landing gear has given more stability to the aircraft and increase in pitch attitude and altitude was less in comparison of retracted Landing Gear.